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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CHAMBLISS, ALONZO

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 12/14/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/732,821

Applicant(s)

FJELSTAD, JOSEPH

Examiner

Alonzo Chambliss

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) 43-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 1-42 in Paper No. 10 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 43-48 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected claims, there being no allowable generic or linking claim.

Information Disclosure Statement

2. The information disclosure statement submitted on 12/7/00 was filed after the mailing date of the non-final rejection on 12/11/01. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the petition is granted and the information disclosure statement is being considered by the examiner.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: solder balls 160 on page 9 line 31, 110"', 120"', 170"' all on page 111. Also, the drawings are objected to because they include the following reference sign(s) not mentioned in the description: 140, 150, 140', 110', 116'-118', 150', 155', 120'', 240,

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200', 200'', 211''-213'', 330, 908, 1240, 1408, 1520, and 1530. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of **50 to 150** words. It is important that the abstract not exceed **150** words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. In Claims 1, 18, 22-24, 26, 29, 30, 35-39, 41, and 42, the phrase " resistive material " is vague and indefinite since it is not clear how the material is resistive. For example, is the material resistive to air, water, heat, cold, etching, or light.

8. In Claims 2, 25, and 31, the phrase " a plurality of resistors is manufactured simultaneously using a single sacrificial layer " is vague and indefinite since it is not clear where the resistors are formed on. Is the applicant implying that the sacrificial layer and pads covered by a material form a resistor?

9. In Claim 2, the phrase " separating at least some of said resistors " is vague and indefinite since it is not clear what the resistors are separated from.

10. Claim 6 recites the limitation " the apertures " in line 4. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 10 recites the limitation " said aperture layer " in line 4. There is insufficient antecedent basis for this limitation in the claim.

12. Claim 18 recites the limitation " pad " in line 3. There is insufficient antecedent basis for this limitation in the claim.

13. In Claim 20, the phrase " sacrificial layer includes a dielectric defining said first surface " is vague and indefinite since it is not clear if a dielectric layer is on the first surface of the sacrificial layer or the sacrificial layer is made of a dielectric material. Furthermore, is not clear if the dielectric and the seed layer are one in the same.

14. In Claim 25, the phrase " a common insulating layer " is vague and indefinite since it is not clear where the insulating layer is relative to the sacrificial layer or the material (i.e. resistive material).

15. Claim 26, the phrase " trimming said resistive material in at least one said unit to control the resistive value " is vague and indefinite since it is not clear how trimming controls the resistive value of the resistive material.

16. Claim 26 recites the limitation " the resistive value " in line 3. There is insufficient antecedent basis for this limitation in the claim.

17. In Claim 40, the phrase "sacrificial layer including exposing said second surface, with said etch-resistant material disposed thereon " is vague and indefinite since it is not clear what the second surface is exposed to. Furthermore, where is the etch-resistant material disposed on after exposing the second surface?

Claim Rejections - 35 USC § 102

18. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

19. Claims 1, 4, 5, 10-12, 14, 15, 20, 24, 27, 29, 37, and 38, **insofar as some of them being definite**, are rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka (JP 3-94459).

With Claims 1, 4, 5, 29, and 38, Tanaka teaches a sacrificial layer 36 having a first surface and one or more pads 34b including at least one electrically conductive material disposed over at least one region of the first surface. A material 22 is deposited over the pads 34b and over the first surface of the sacrificial layer 36 to thereby form at least one unit including the material 22 and the pads 34b. The material 22 has cavities 42b in the first surface of the sacrificial layer 36. Conductive material 26 is on the first surface of the sacrificial layer 36, which is placed within the cavities 42b to form conductive pads within the cavities 42b. A portion of the sacrificial layer 36 is removed to expose the pads 34b (see English abstract and figures).

With respect to Claim 10-12, 24, and 37, a portion of the aperture layer 13 (i.e. insulating layer) is removed from the first surface of the sacrificial layer then only a portion of the aperture layer 13 remains on the surface of the sacrificial layer 12 (see Fig. 2a). The next step requires that the entire aperture layer 13 be removed from the first surface of the sacrificial layer 12 (see Fig. 2b).

With respect to Claim 14, a portion of the sacrificial layer 40 includes etching the sacrificial layer (see Fig. 5b).

With respect to Claim 15, the pad 42b is elongated in the horizontal direction when compared to the vertical direction (see Figs. 5a and 5b).

With respect to Claim 20, the conductive material 15 is plated on the surface of the aperture layer 13 (i.e. seed layer) (see Figs. 2a and 2b).

With respect to Claim 27, a portion of the sacrificial layer 40 is separated from the resin material 22 (i.e. resistive material) while leaving some of the sacrificial layer intact (see Fig. 5b).

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. Claims 2, 3, 25, 26, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka (JP 3-94459) as applied to claims 1 above, and further in view of Lake et al. (U.S. 5,937,512).

Tanaka fails to disclose a single sacrificial layer separated from a resistor and then the resistor is subdivided into different units. However, with respect to Claims 2, 3, 25, 26, and 31, Lake discloses using a single sacrificial layer 10 separated from a resistor 18 and then subdivided into different units (see col. 3 lines 38-41 and 55-59). Therefore, it would have been obvious to use the separation step with Tanaka, since creating several devices simultaneously would save time, money, and increase productivity as shown by Lake.

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Allowable Subject Matter

22. Claim 6-9, 13, 16-19, 30, 33-36 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: the prior art of record does not teach the combination of cavities on the first surface of the sacrificial layer include providing an apertures in the aperture layer. Depositing a first conductive material in the cavities and then depositing a second conductive material in the cavities of the sacrificial layer. Each of the pads includes a post and one flange wider than the post portion. Each of the pads having a hollow shell with the cavities in the sacrificial layer, wherein a material is applied into the hollow shells.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. It is cited primarily to show processes of packaging a semiconductor device, which are similar to the process of the instant invention.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956.

AC

AC/December 12, 2001



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